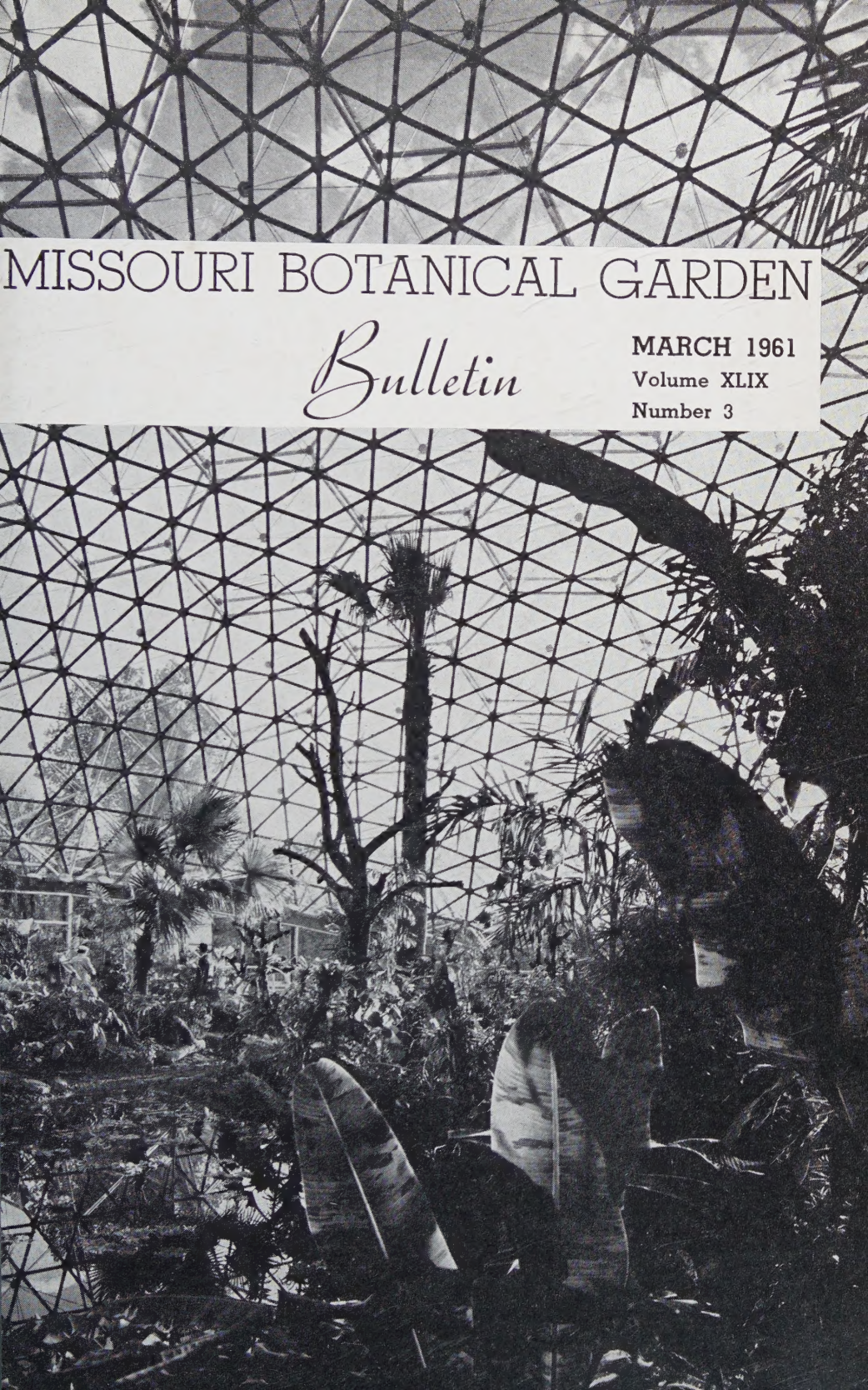

MISSOURI BOTANICAL GARDEN

Bulletin

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COVER: Inside Climatron showing bog area soon after planting.
PHOTO BY HEDRICH-BLESSING

CONTENTS

Report of the Director for 1960

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Missouri Botanical Garden Bulletin

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MISSOURI BOTANICAL GARDEN REPORT OF THE DIRECTOR FOR 1960

FRITS W. WENT, DIRECTOR

IF success of an institution is measured by public interest, then the Missouri Botanical Garden has done well in 1960. During the 10-year period 1949-1958, an average of 211,710 persons visited the Garden per year. In 1959 the number was 279,800, or 32% above the 10-year average, and 20% above the previous 20-year average. In 1960 the attendance as measured by turnstile count at the main gate, was 423,302 visitors, which is just 100% over the 10-year average, and 80% over the 20-year average. This attendance has been equaled only once (in 1929) and has been exceeded in 1928 (468,100 persons). If we add an estimated 18% to the main gate count because of persons entering through the Cleveland and Alfred Avenue gates, our attendance last year was half a million. This compares favorably with estimated attendance at the New York Botanical Garden and Kew Gardens near London, of about one million visitors per year, since those gardens are located in areas where the population is about four times that of the St. Louis area.

In our 1959 report we resumed a former practice of publishing the monthly attendance figures, and are including now therewith the figures (in thousands) for 1960 with the 10-year average and 1959 attendance for comparison.

	1960	*1959*	*Average 1949-1958*
January	14.5	5.3	6.6
February	24.2	12.1	12.2
March	11.6	25.6	13.6
April	44.7	25.8	22.1
May	44.6	25.6	23.7
June	29.1	25.3	19.4
July	46.7	27.7	21.4
August	41.6	25.5	22.9
September	30.6	37.3	22.4
October	60.4	40.6	22.7
November	53.1	22.5	20.7
December	22.2	6.0	9.0
Year	423.3	279.8	211.7

From the 1960 figures it will be seen that, with the exception of March which was exceptionally cold and during which the ground was covered with snow practically continuously, the monthly attendance was higher than in similar months during the last ten years. It is also interesting to note that the peak month of April was due to the exceptionally fine bulb displays in the Garden and the excellent Spring Show, whereas the October figures are due to increased interest in the Garden resulting from the opening of the Climatron. The December attendance figure also far exceeds those of previous years, showing to what extent the

Climatron is important in our overall operation.

At present, attendance at the Missouri Botanical Garden on its peak Sundays is limited by automobile parking facilities on Tower Grove Avenue, Flora Boulevard and side streets. Therefore we *must* provide off-street parking if we want to serve the St. Louis public to the extent we believe local interest in gardens and plants is concerned. If no parking limitations existed, we believe that within a few years, attendance at Shaw's Garden would reach a million visitors per year, or about four times that of comparable Botanical Gardens. Even the present achievement must be considered a record for an institution which receives no tax support (except for its scientific activities), and charges no general admission fee.

The reasons for our success are simple. The Garden is located inside the city boundaries of a great metropolitan center. The private benevolence of Henry Shaw, and recently of many prominent citizens, has enabled the Garden to provide unparalleled surroundings for public enjoyment, in addition to the financial support from thousands of St. Louisans as "Friends of the Garden." The devoted efforts of the Garden staff to improve the Missouri Botanical Garden, a certain amount of imagination offering completely new and exciting experiences for our visitors, and educationally interesting information, are providing new pleasures never before offered anywhere. We believe that we can continue this program and improve on it, setting an example for institutions all over the world, proving that Botany and Horticulture are of such universal appeal and significance that their pursuit can sustain a garden of unusual attainments.

The major achievement of 1960 was the completion of the Climatron, which was officially dedicated on October 1, and opened to the public for the first time on October 2. The dedication ceremony was held in front of the East entrance of the Climatron at dusk, and Dr. Detlev Bronk, President of the Rockefeller Institute of New York, gave the dedicatory speech. A very large number of Friends of the Garden, all Trustees, a number of prominent St. Louisans and distinguished out-of-town botanists such as the Directors of the New York Botanical Garden, Longwood Gardens, the Morris Arboretum and the Arnold Arboretum, attended and saw the Climatron opened by the dramatic turning on of the lights. The Women's Association offered refreshments inside the Climatron for all guests at the dedication ceremony. An estimated 1,500 persons filed past the refreshment tables at the lower level of the Climatron.

Right from the beginning, the attendance of paying visitors at the Climatron has been a success. The average weekly income from these visitors has fluctuated considerably but, if anything, shows a tendency to increase. Sunday attendance has always been best, with receipts ranging from $500 to $1,000. We had our peak attendance on Sunday, October 2, with Thanksgiving Day as a close second. During the weeks before

Christmas, attendance was low; however, this is a normal seasonal drop occasioned only partly by bad weather conditions. Weekday receipts average $100, while the average on Saturday is $200. Many school children and other students have taken advantage of free admission extended to those groups.

Since November 3 the Climatron has been open to visitors on certain days between 5:00 and 9:00 P. M. Originally, it was open Thursday through Sunday evenings; however, it developed that the Thursday night attendance was too low to justify the expense involved, with the result that the Climatron is now open Friday through Sunday evenings. Sunday evenings always bring the greatest number of late visitors, and again on Thanksgiving, there were more evening visitors than on any other night.

During the first week that the Climatron was open, a series of lectures was given in the evening for Friends of the Garden, as follows:

October 2, 1960, Dr. Erwin Bünning, Director, Botanical Institute and Garden of the University of Tübingen, "Biological Clocks in Plants"; and Dr. Edgar Anderson, Curator of Useful Plants, Missouri Botanical Garden, "Experimental Research at Shaw's Garden."

October 3, 1960, Dr. Russell Seibert, Director, Longwood Gardens, Kennett Square, Pennsylvania, "The Significance of the Privately Operated Botanical Garden."

October 6, 1960, Dr. Frits W. Went, Director, Missouri Botanical Garden, "Plants and Gardens in the Western Hemisphere."

These lectures were fairly well attended. It was interesting to note that, with the proper public address system, the speaker could be heard, although the acoustics of the Climatron, from the lecturer's point of view, are not ideal. On the other hand, the acoustics are excellent for the different jungle noises and the sound of the waterfall, all of which reverberate through the entire building to the extent that it is impossible to determine their exact source, with the resultant very natural effect.

In June Ladislaus Cutak went to southern Florida to select and dig palms and other materials to be displayed in the Climatron. Mr. C. A. MacFall, Jr., of the Lee Freight System, donated a truck for transporting this material to St. Louis. The plants were given to the Missouri Botanical Garden by the Fairchild Tropical Garden, Mrs. Alvin R. Jennings and the U. S. Plant Introduction Garden. This material was temporarily kept in our other greenhouses, and in August was planted in the Climatron. Further plantings were made in September and succeding months so that, by the time the Climatron was officially opened, the visitors were greeted with a fine display of vegetation.

Much of the plant material is growing very rapidly, and within a few years we can expect to have most of the space in the Climatron filled with the more rapidly growing tropical trees and shrubs which then can be gradually replaced with the typical primary forest trees of the jungle.

On June 15 C. Ranlet Lincoln assumed the position of Assistant to the

Director, and his efforts have been most effective in handling many phases of construction and operation of the Garden.

During the summer the Director and Mrs. Went traveled through Europe, visiting Botanical Gardens and parks. One of the main objectives was to find the best features of these gardens and parks, with a view of incorporating them in the Missouri Botanical Garden.

The places visited ranged from the purest Botanical collections with little attempt to make them attractive to the public, to an amusement park with attractive flower gardens (Tivoli in Copenhagen). As far as attendance is concerned, Tivoli had the greatest popularity, with free concerts, shows, circus performances, an amusement park for both adults and children, and many restaurants (a total of 9,500 seats). During the 4½ month season a million persons pass through the Tivoli gates *per month,* which compares with a similar attendance *per year* for Kew Gardens in London, and the New York and Brooklyn Botanical Gardens, and of Planten un Blomen in Hamburg and the Palmengarten in Frankfurt. The latter two have attractive restaurants, very colorful flower displays, music and other attractions, which explains their popularity in cities considerably smaller than London or New York. But in none of these Gardens or Parks were the *plants* displayed for their own sake, nor were their interesting aspects, morphologically, taxonomically, gastronomically or economically, sufficiently stressed. Both Tivoli and Planten un Blomen are self-supporting and do not need any tax-money. The number of seats in their restaurants are 9,500 and 9,000 respectively.

Since we do not want to become an amusement park, and since the Garden has to become self-supporting, we will have to stress 1) eating facilities, 2) special attractions like the Climatron, 3) attractive floral displays throughout the year, and 4) botanical information of the highest order of interest and practical significance.

Several experiences of special interest were 1) the realization that the baroque style, as exemplified by many churches in Bavaria, Austria and Czechoslovakia, have a spirit akin to the richness of flowers and the grace of floral displays, and that it would be highly appropriate to build any new Floral Display house in this style. Originated by Michelangelo with his creative exuberance, it became generally accepted because of its bigness of scale, boldness of details and the vigor of its rhythmic flow. In general, Floral Display houses are conventional greenhouses (like our present one) of which the basic architectural outlines have to be softened by camouflaging them with trees and palms, or they are just barns, erected for cheapness, of which one hopes that their structure will be de-emphasized by color and grace of the flowers displayed.

2) One of the finest gardens visited, but the least satisfying, was Saville Gardens in Windsor Great Park in England. These gardens were laid out somewhere in the middle of the stately semi-wilderness of the old

hunting grounds of the English kings. Since there is no house or other human structure in or near the gardens, they seem to lack a purpose, and seem lost, in spite of their design. A lawn which does not provide a view from a window, or walks which neither start nor end are an artifice in the domain of nature.

3) Everywhere, in England, Holland, Denmark, Germany and Czechoslovakia, old private estate gardens are made into public gardens and in general a nominal admission fee is charged as a contribution to operating expenses. But we had the impression that admissions could pay only for a small fraction of the actual running costs. Besides, most of these estates are too far away from metropolitan centers to attract a sufficient number of visitors.

4) In most of the Botanical Gardens with particularly rich botanical collections, one or more professional botanists were employed to build up the living collections (Kew, Münich, Göteborg). Not only the greenhouse collections, but also the outdoor taxonomic plantings, the rock gardens and arboreta were rich in forms wherever special efforts were made to develop and maintain such collections through seed and plant exchange and through special expeditions.

5) Wisley Gardens of the Royal Horticultural Society occupies a special place because of its large-scale testing of plant materials and planting methods. They can also be described as demonstration gardens such as we want to establish here at the Missouri Botanical Garden.

This year the Director again has spent much time in lecturing: University of Pittsburgh, University of Florida, American Meteorological Society, Kansas City Meeting, Southern Illinois University, Cold Spring Harbor Symposium, Purdue University, Sorbonne (Gif Phytotron), University of Utrecht, Vegetable Research Station in Olomouc, Czechoslovakia, Agricultural Research Institute of Canada, Pioneer Hybrid Corn Company, Des Moines. In addition, he has given talks for local groups of gardeners and professional people. He also attended many meetings concerned with botanical problems, such as a tree growth conference in Tucson, a committee on Tropical Botany, and meetings of the Governing Board of the American Institute of Biological Sciences and of the National Committee of the International Union of Biological Sciences.

In September a Visiting Committee of the National Institute of Health was at the Garden for a day in connection with the Garden's application for a facilities grant for the new Research Building, for which we already had a $250,000 grant from the National Science Foundation. This Committee obviously made a favorable recommendation, since we have received word that the National Institute of Health recommends a grant of $188,281 toward the new Research Building.

Preliminiary architectural plans for this building were made by the architects Murphy and Mackey, including laboratories for experimental work, a library and an herbarium which would

virtually double our present space.

During the past year the Garden has received a great deal of publicity, especially in connection with the opening of the Climatron. This publicity was local, national and international, and consisted of newspaper spreads and radio and TV programs, in which many staff members participated, particularly George Pring.

One of the major activities connected with the Garden was the work of the "Friends of the Garden." Under the able leadership of newly appointed officers, Mr. John Averill, President; Mrs. William Bascom, Vice President; Mr. Sears Lehmann, Treasurer; and Mr. Harry Wuertenbacher and Mrs. Curtis Ford, Co-Chairmen of the Membership Committee, a major membership campaign was started which, in spite of an increase in membership fee from $5 to $10, materially increased the number of members in this organization and almost doubled the income of the previous year.

The Historical Committee, organized in 1959, continued its work in 1960 and in addition to further improving the restoration of the Tower Grove House, also restored Henry Shaw's Mausoleum, which is now again in prime condition. This work was financed by income from admission fees from the Tower Grove House, and by a contribution from the Women's Association.

The Women's Association expanded on its already impressive record of devoted, imaginative and most effective service to the Garden. Under Mrs. W. Warren Kirkbride's splendid chairmanship, the ladies were not content to rest on their laurels, or even to

"Through the Garden Gate" exhibition 1960 PHOTO P.A.K.

repeat their past successes, but continually devised new and attractive projects. Outstanding among these during the past year were: The "Pass the Hat" campaign, restricted to the Association's membership, in which gaily-decorated miniature hats accompanied an appeal for funds, phrased in verse by Mrs. Henry B. Pflager who, with Mrs. Charles A. Brandon, directed the campaign; and the Garden Gate exhibition and sale of garden material in May. This highly successful project was sponsored by the Famous Barr Company, and held at the parking lot of the Famous Clayton store. With an enormous quantity of creative effort by the Association, led by Mrs. J. Bruce Butler, the Garden Gate not only earned over $5,000 which was donated to the Garden, but also established itself as a new feature of spring in St. Louis. It will be held again in 1961, and the Association is confidently expecting to double the proceeds.

In addition to his administrative duties, Hugh Cutler continued his research on useful plants. This was supported by a National Science Foundation grant. During the summer he was assisted in this work by Michael Wynne, a botany student at Washington University. In May, Cutler took part in the conference of Directors of Systematic Collections at Lawrence, Kansas. During August he participated in the Pecos Conference at Flagstaff, Arizona, and studied plant collections in institutions in New Mexico and Arizona.

From February through August Edgar Anderson was in residence at the Garden, and spent most of his time in research and writing. From September on, he taught and consulted at Connecticut Wesleyan College, Middletown, Connecticut.

THE HERBARIUM

ROBERT E. WOODSON, CURATOR

ALTHOUGH no one event may be singled out as particularly significant, the year 1960 has been a highly satisfactory one in the herbarium. Gains of the past few years have been consolidated and small, but consistent advances made on all fronts.

A total of 18,425 specimens were mounted and incorporated in our collection, bringing the estimated content of the herbarium to 1,759,281 sheets. (The number added this year is almost half that of the preceding year, which reflects pressing need for the conservation of our inadequate space.) 6,612 sheets were forwarded as loans requested by other institutions, of which we take a bit of pride in noting that almost one-quarter were sent outside the U.S.A. In the same period the Missouri Botanical Garden received on loan from other museums 5,513 specimens for research of our staff and students. 4,358 specimens were received on exchange from other museums and we reciprocated with 1,725 sheets.

As in many previous years, the principal research project of the herbarium has centered about the "Flora of

Panama," in which Woodson has received indispensable collaboration from James A. Duke, C. H. Dodson and R. L. Dressler of our own staff and specialists of other institutions. During 1960 two new fascicles were published. An outstanding feature of the "Flora" are the numerous beautiful and very critical line and stipple drawings prepared by Bernadette Velick. The "Flora of Panama" is supported by grants from the National Science Foundation.

A second group project of the herbarium staff was the identification of very many plants of Peru collected by Mr. Felix Woytkowski because of their therapeutic or ceremonial use by aboriginal tribes, particularly in the Amazonian headwaters. This research, undertaken under the auspices of Ciba Pharmaceutical Products, Inc., of Summit, New Jersey, is one of the more ambitious projects dealing with drug plants with which our staff has been concerned for most of the past decade, in cooperation with numerous concerns of the pharmaceutical industry. Such activity carries on the role in the interest of public health which the Missouri Botanical Garden has played since the pioneer research on viruses initiated by the late Dr. B. M. Duggar, for many years our plant physiologist, and the fundamental studies of medically important fungi by our present mycologist, Carroll W. Dodge.

In addition to the "Flora of Panama," Woodson has continued his study of population problems in the butterflyweed, *Asclepias tuberosa,* which is supported by grants from the National Science Foundation, as are the studies of Dodge on Antarctic lichens, of Bunting on *Philodendron* and those of Dressler on orchids. A particular pleasure to our staff has been the association with one of our alumni, Dr. Richard W. Holm, now of Stanford University, who is spending a sabbatical year with us.

As sparetime projects Duke is finishing a revision of the genus of *Drymaria,* a weedy tropical genus of some 75 species, and is beginning a revision of the genus *Triplaris,* a group of tropical ornamental trees cultivated throughout Central and South America and the West Indies.

Robert Dressler together with Cal Dodson completed for publication in 1960 the "Classification and Phylogeny in the Orchidaceae," though this really represents work done for the most part in 1959. This review and evaluation of orchid classification with some ideas on relationship and phylogeny, has provided a background for much of our future work and has stimulated interesting correspondence with a number of colleagues. A number of short notes have been published, some of which are technical, and some in a more popular style.

A proposal to the National Science Foundation for support of this work has been granted. A small grant ($400.00) was obtained from Washington University Graduate School Special Research Fund, which is to be used in the preparation of illustrations of orchids for these research studies.

Dressler attended both the Second Mid-America Orchid Conference in Chicago, and the American Institute of Biological Sciences Meetings in

Stillwater, Oklahoma. Papers were presented at both meetings.

George Bunting has had his activities divided between the herbarium and the living collections. He assisted in identification of many dried collections from Peru and Panama, as well as specimens sent in by the public for determination. An attempt has been made to name all living plants in the Climatron and other greenhouses. Laminated plastic labels recording pertinent data about the species have been prepared and applied to the specimens already determined.

Throughout the flowering season of daffodils *(Narcissus)*, the named varieties and some unnamed seedlings (known as "Powell hybrids") were observed, their locations mapped, and notes made concerning their excellence for use in gardens in the St. Louis area. This project was aided by Josephine Davies, Mr. and Mrs. George Pettus, Kenneth Peck, Mrs. Frits Went and Edgar Anderson.

Cal Dodson was given a temporary position beginning in September as a Research Associate for the "Flora of Panama" project. He has worked on the families *Anacardinaceae* and *Sapindaceae* and is nearing completion of this phase of the project. In addition, his spare time has been devoted to the completion of a revision of the subtribes *Stanhopinae* and *Catasetinae* of the family *Orchidaceae*.

The pride of our herbarium, as for the Henry Shaw School of Botany of Washington University as a whole, always has been our students. At the June commencement the degree of Ph.D. was conferred on Loren I. Nevling. Nevling is now assistant curator of the herbaria of Harvard University where he has for associates two fellow alumni from the Missouri Botanical Garden, Dr. Clarence E. Kobuski, his immediate superior, and Dr. Lily M. Perry. Post-graduate students presently in residence and their respective research topics include William C. Burger (*Sorocea* and related genera of Moraceae), Phung Trung Ngan (The Asian genera of Cynanchoideae), Gordon Hunter (the Central American species of *Saurauja*), Howard Pfeifer (the North American and Antillean species of *Aristolochia*), Samuel W. Rosso (the tribe Apostasieae of Orchidaceae), and Fuad M. Safwat (the evolutionary morphology of the asclepiad anther). Burger, who came to us three years ago with the degrees of A.B. from Columbia University and A.M. from Cornnell University, expects to receive the Ph.D. at the June 1961 commencement of Washington University.

During much of 1960 the curator, Robert E. Woodson has been conspicuous by his chronic absence from the herbarium because of imposed substituting at the University for Dean Andrews, who is spending a sabbatical year in India. Yet the routine has moved smoothly, thanks to the understanding diligence and close coordination of the rest of the herbarium staff: James A. Duke, assistant curator; Barbara Mueller, secretary; George S. Bunting, taxonomist; Gordon Hunter, graduate assistant; Cindy Rosso, mounter; and Jack Wasinger.

THE LIBRARY

GEORGE B. VAN SCHAACK, Librarian

Acquisitions, cataloguing and binding occupied as usual much time of the library staff. In addition to the several hundred serials normally added to the collections, 213 new titles were catalogued. The number of books bound was 408. The project, reported last year, of reproducing the catalogue and shelf list on standard size cards was completed late in the year. The long delay in finishing this work, the result of the contractor's unsuspected lack of technique, was a major burden for eighteen months. Since a library catalogue is always changing, the job of keeping both the original and the incomplete copy up-to-date called for much staff time, which had not been anticipated. The new copy of the shelf list is filed adjacent to the card catalogue and will serve as a kind of classified catalogue, particularly useful since the card catalogue has few subject entries.

Shelf-housekeeping continued the replacement of worn-out pamphlet folders and the provision of strong cardboard slip-cases for several score older books in leather binding. Several hundred volumes of little used unbound journals were provided with firm cardboard covers into which the several numbers of each volume were pasted. The neat and easily consulted books thus produced are much more easily kept clean and in order on the shelves than the thousands of loose fascicles.

Although no statistics are available, it is obvious that the use of the library has increased in the last few years; in particular, more people not on the staff or among the regular students are using the collections and inter-library loan requests have increased. The library has been able to meet these needs fairly well but the lack of convenient reading areas and the general crowding of the shelves are indications that more adequate quarters for the library are badly needed.

EDUCATION PROGRAMS

K. O. PECK
in Charge of Visitors' Activities

The activities of the Programs are under the direction of Kenneth Peck. He was assisted by Josephine Davies, who left in December to return to her home in England.

Children's Activities—The children's classes in 1960 were well attended in all phases. Some of the Saturday morning programs, such as Miniature Gardens and Christmas Decorations were attended by as many as 100 children, although the usual attendance on Saturday mornings was somewhat lower. A number of high school biology students participated in these classes for extra credit given them by their school instructors.

The Pitzman Summer Nature Program, in its third year, had 472 registrants for the two 5-week sessions

of classes. Approximately half of this number received certificates. As a part of the Pitzman Program, five groups of children were selected to form the Junior Research Teams. These teams investigated several matters of nature study. Details of these activities are described by Davies in the November, 1960 BULLETIN.

In October and November, about 600 children from three local schools visited the Garden to plant Paperwhite *Narcissus* bulbs which they were permitted to take home. As in the past, each child was given two bulbs and a period of instruction of what bulbs are and on how to grow them.

In addition to classes, over 130 tours were conducted for both children and adults as compared to only 90 tours in 1959. Late in 1960, most of the tours were in the Climatron which is the favorite tour attraction in addition to the floral displays. The Tree Trail, as usual, was exceedingly popular during the growing season. The Trail was changed this year and a new and fully illustrated guide sheet was given to all who requested it at the Main Gate.

Adult Courses — Clarence Barbre taught the courses for adults, consisting of Bulb Forcing, Plant Propagation and Spring Horticulture. Norton Nickerson, Robert Gillespie, George Bunting and Robert Dressler taught other courses in botany and horticulture.

Plans were made for a new program of adult instruction in Gardening and in Botany, with several new courses to be offered in 1961. See BULLETIN, January, 1961.

Other Activities—The preparation of many kinds of educational displays is one of the important functions of the Education Programs. Some of these displays were used in the Climatron and Floral Display House. Informative and identifying labels were prepared for some plants. A particularly fine set of signs for various lawn grasses and weeds was prepared by Paul Hale and Henry B. Lenhardt. About 80 people took part in a Sunday morning Grass Walk conducted by Edgar Anderson, George Van Schaack and Raymond Freeborg.

During the fall semester the Garden conducted a college botany course at the request of St. Louis Baptist College. Lectures were given in the Museum Building and laboratory sessions in the classroom of the Experimental Greenhouse. Robert Gillespie, Robert Dressler and George Bunting gave most of the lectures, while the laboratory work was supervised by Walter Hewitson.

CLIMATRON AND GREENHOUSES

LADISLAUS CUTAK, Horticulturist

The major project was the completion of the Climatron and subsequent landscaping of the interior in time for the official opening on October 1. As soon as the scaffolding was removed in early July, the removal of accumulated debris and dead palms was undertaken as the first step toward grading in preparation for actual landscaping. Walks were staked out, topographical features planned, water lines laid down and about a hundred tons of mushroom compost was incorporated into the soil. Most of the work was done by the regular Garden crew, although Rallo Contracting Company and Pring Landscapers were called in to do the heavy equipment work such as grading, moving tons of soil, digging holes for the specimen plants and hauling the huge palms into place. By the middle of August the Climatron was ready to receive the first plants. Thirteen large palms were set in place, and then actual planting began on August 17, and was completed in three days. These large palms—including two 25′ coconuts, two 30′ royals, one 35′ *Washingtonia* and several cluster palms came from Florida as donations, specifically from Fairchild Tropical Garden, the Jennings Estate, and the U. S. Plant Introduction Station at Chapman Field, Florida.

The specimen palms were root-pruned in March and were picked up in the latter part of May for transportation to St. Louis. It might be of interest to readers to learn that palm roots do not form new root-caps when injured or severed as in transplanting, so that new roots must be grown to sustain the plant. Palms, however, produce innumerable roots almost continuously, although during the winter months the root growth is comparatively dormant; therefore root pruning is advisable at that time. This gives the new short roots a chance to grow without disturbing their power to function. In the latter part of May, Lad Cutak and Al Mielczarek drove to Florida to prepare the palms for shipment to the Garden and to gather other plant material for the Climatron. The Lee-American Freight Lines of St. Louis dispatched a 40′ enclosed van to transport the palms, free of charge to the Garden. They did an excellent job and the plants arrived in very good condition, considering the warm windy weather prevalent during that period. To further protect the shipment, the palms were placed in the rear of the Flower House where boxes were built around their root balls and wood chips added to conserve moisture until actual planting was contemplated. By the time the Climatron was ready to receive the plams, the new roots had begun to burst through the burlap.

The men worked feverishly for long hours to meet the deadline, and by the time the grand opening became a reality, the project was worthy of their efforts and something of which to be proud. The bog area began to shape up nicely in early September,

and with the placement of Water Hyacinths and other aquatics, no one but the workers would suspect that the area planting was so recent. An eight-foot high "mountain" was slowly built and plants were established on its slopes. One will need only a vivid imagination to foresee what a startling feature this mountain will be when the plants reach their maximum size in the Climatron. Another outstanding feature is the waterfall whose water tumbles thunderously down the mountainside and drops to the lower levels. Actual work on the waterfall was begun on September 21, and in less than a week the project assumed a naturalistic aspect far beyond our expectations. It is now one of the big features for the visitors where many pictures are taken by shutterbugs. Feather rock (pumice stone) was used in the construction because of its light weight, and one large rock floats in the lower pool to the amazement of visitors.

The Hawaiian area was started on September 23 and includes plantings of *Hibiscus, Bougainvillea,* crotons and other showy plants that are generally cultivated in the Islands. In early October Cutak was sent to Longwood Gardens in Kennet Square, Pennsylvania, to pick up a van load of material, chiefly tree ferns. These are now forming a striking feature in the Hawaiian area and also as group plantings on the mountain and around the waterfall. In December Cutak went on a collecting expedition to South America.

The tropical waterlilies in the outdoor pools were left undisturbed until they were taken out on November 4. As usual, they produced a good show until late in the season.

FLORAL DISPLAYS

PAUL A. KOHL, Floriculturist

The annual orchid show, the first major floral display of 1960, opened with a preview for the Friends of the Garden on the evining of January 21.

Some *Camellias* bloomed in December and January, but February was the month when all of the plants in the Linnean house were bedecked with hundreds of flowers. Visitors from other parts of the United States are amazed at the size of our plants which can compare with those grown outdoors in the South. During the year our collection of *Camellias* was augmented by thirty-two varieties of cuttings and small plants shipped to us by the Descanso Gardens of La Canada, California. We also received from the Norfolk Botanical Garden, Norfolk, Virginia, one plant of the rare *Camellia granthamiana,* discovered in Hong Kong in 1955.

The African Violet Show, scheduled for March 5 and 6, was postponed to May 7 and 8. Members of Friends of the Garden were invited March 10 to meet the new officers of the association and for a preview of the Spring Flower Show of tulips and daffodils. The tulips came from Holland, and the 24 varieties of daffodils were donated by

Mr. Jan de Graaff of the Oregon Bulb Farms. The Easter display opened on Palm Sunday, April 10. Many kinds of colorful plants were used in this show, the *Azaleas* being the most spectacular.

The Daffodil Show, scheduled for April 9 and 10, was cancelled, as was the Spring Flower Show of the St. Louis Horticultural Society for May 14 and 15. The Rose Show of the Greater St. Louis Rose Society was postponed from May 21 to May 28. *Hydrangeas* were on display during June, and these were followed by *Caladiums* and other foliage plants. The first *Hemerocallis* show was staged on the balcony on July 9. The Illinois Gladiolus Society held its show July 24 and 25. *Cacti* were displayed September 3 through 11 by the Henry Shaw Cactus Society. The Greater St. Louis Harvest Show, sponsored by the Regional Council of Men's Garden Clubs of Greater St. Louis, was held September 17 and 18, and a week later, September 24 and 25, the Dahlia Society of Greater St. Louis staged its show in the flower house. The Veiled Prophet Queen's bouquet was on view October 5. The annual Chrysanthemum Show opened with a preview on November 3 and was followed in December by the Christmas display of *Poinsettias*.

Exhibits Away from the Garden or Unrelated to Flower Shows: The model of the Climatron was exhibited in the Mercantile Commerce Bank during the week of January 25. April 2 and 3 the Missouri Aquarium Society displayed tropical fish on the balcony of the floral display house.

April 24 was Flower Sunday at

The African Violet Show May 1960 PHOTO P.A.K.

Christ Church Cathedral, and for that event 200 plants were used to decorate the church for the Annual Flower Sermon, provided for in the will of Henry Shaw.

Marguerites were displayed in front of the St. Louis Chamber of Commerce building on Broadway for the Cleanup Campaign Week of April 25.

"Through the Garden Gate," a fund-raising project of the Women's Association of Shaws Garden, was held on the parking lot of Famous-Barr in Clayton, May 12 through 14. Four thousand annuals and perennials were supplied for this plant sale, and shrubs from the Experimental Greenhouse were also donated.

The St. Louis Aquarium Society held its show July 16 and 17. October 8 and 9 the Budgerigar Society of Missouri, Inc., held its Midwestern Regional Show in the flower house.

ORCHID COLLECTION

R. J. GILLESPIE, Orchidologist

Cultural Improvements—The installation of "Rain-Jet" automatic sprinklers, which were tried experimentally in 1959, was continued in 1960 so that at present all houses can be watered by this system when desired.

In the Spring of this year, a fertilizer proportioner was attached to the water main and a constant level nutrient feeding system was begun. This fertilizing provides a constant and complete fertilizer solution always present, at a predetermined concentration, in the water which is being applied to the plants. While it is much too premature to evaluate the effects of this program, numerous plants in the collection have made unusually large, robust growths during the past season indicating an improved environment.

Artificial Orchid Trees—An interesting aspect of the Orchid Department's work during the year was the development, under the personal supervision of Frits Went, of a group of artificial orchid trees. These trees were made by welding together numerous steel pipe segments to form a tree-skeleton, and then covering this skeleton with Osmunda fern fiber. Botanical orchids were then attached to the Osmunda in permanent position. The plants on each tree were collected from the same geographic area, and thus represent natural grouping. These trees are now located in the Climatron and the extent to which they have prospered in that environment is quite obvious, even to the inexperienced observer.

Orchid Show—The annual orchid show was held during the last week of January and during the entire month of February (Jan. 23–Feb. 28). The show consisted of a series of three orchid gardens, a California garden, an Hawaiian garden, and a Florida garden. Numerous hybrid *Cattleyas, Dendrobiums, Cymbidiums,* and *Cypripediums,* as well as a fine selection of the Garden's botanical orchids were staged in these gardens with an excel-

lent effect. A new "first" for the orchid show was achieved in 1960 by the staging of a table of miniature orchids illuminated under magnifying glasses, which enabled the public to observe the unusual colors and the intricate floral details of these plants.

Displays—A continuous display of orchids was maintained throughout the year in the Botanical Orchid House and in the alcoves until the opening of the Climatron in October. A new display area was constructed just inside the main entrance to the Climatron and another circular botanical staging was built and is now being used in the Climatron. Orchid cut flowers or plants were supplied weekly to the Shaw House and as usual, cut flowers were supplied by the Garden for the Veiled Prophet Queen's bouquet.

A number of Orchid plants and flowers were also given to various deserving individuals and institutions during the year. A selected group of the Garden's orchid plants were used in driftwood displays in Famous-Barr's Clayton store during the May Garden-Gate benefit sale by the Women's Association.

Accessions—New introductions into the orchid collection (some 900 entries) were particularly noteworthy during the year 1960. Many new species of botanical orchids, chiefly from South America, were added to the collection. One particularly valuable accession was a collection of selected Ecuadorian specie orchids which was donated to the Garden by Cal Dodson, formerly Director of the Botanical Institute, University of Guayaquil, Guayaquil, Ecuador, and now on the Garden Staff as Research Associate. Another interesting and valuable group of orchids from Indonesia was acquired for the Garden by Frits Went. This material adds some plants to the collection from an area from which the Garden had had only a few representative species.

Research and Instruction—The potting medium experiment involving a block of *Cattleya Mrs. John S. Lehman* was concluded (see BULLETIN for October, 1960). In addition, several articles were published during the year by the Orchid Department in national orchid publications. Four courses on orchid culture were given and were well attended and received.

In May, Robert Gillespie had the privilege of being sent to London, England, to represent the Garden at the Third World Orchid Conference. In addition to attending the Conference, Gillespie also visited numerous horticultural concerns and botanical gardens, both in England and on the Continent. The Orchid Collection also participated in the Mid-America Orchid Congress which was held in November in Chicago, Illinois, by assisting in the lecture program and in judging of the orchid show.

GROUNDS AND MAINTENANCE OPERATIONS

LOUIS G. BRENNER, Grounds Superintendent

The increased visitor attendance during the past year, largely induced by the completion of the Climatron, thoroughly tested the abilities of the Grounds Crew who were able to cope with the multitude of problems stemming from increased area usage yet were able to add a considerable number of man-hours toward completion of the Climatron display area.

Few new trees and shrubs were planted on the grounds this year because of constructional features imposed by the Master Plan of the Garden. However, several unusual specimens from the small nursery at the Experimental Greenhouse were planted into the Grounds.

The Webster Groves Men's Garden Club, under the direction of Mr. Dan O'Gorman, organized a volunteer group from this club and again provided Dahlias and Cushion Chrysanthemums for a fine blaze of color in the Knoll area. These men provided hours of patient labor toward propagating and planting this fine display.

The Rose Garden continued as a major summer and fall display, providing an outstanding attraction to visitors who delighted in viewing the best of the new varieties and outstanding experimental hybrids of some of the nation's great rose breeders, with whom the Garden cooperates in displaying most recent creations. Outstanding in the Rose Garden this year were Duet by Armstrong Nurseries Inc., Peach Glow by Jackson and Perkins Co. and Coronado by Peterson and Dering. The continued excellence of the summer rose display was possible largely through the efforts of Mrs. E. F. Stuessie and members of Webster Groves Garden Club Group 4 who volunteered many hours toward light summer pruning and clipping faded blooms in the Rose Garden.

The lawns of the Garden continue to improve. Large scale use of selective weed killers and other herbicides has made relatively light work of the seemingly great chore of lawn maintenance. In October a light dressing of fertilizer was applied to the lawns with the new cyclone type spreader purchased recently. With this unit added to the maintenance inventory it is now possible to apply frequent light dressings of fertilizer under ideal weather and soil conditions, important to good lawn maintenance.

As mentioned above, the Grounds Crew played an important role in the completion of the Climatron where they were responsible for removal of the mass of litter left by the many contractors; hauling and tilling compost into the soil prior to planting; planting of large new palms; constructing walks; aiding in planting the multitude of exotic tropical plant species; and moving and placing the large pumice stones at the base of the waterfall. The dashing mountain brook and ledge of the waterfall were built by Jess Mayhan and George Hochrein, who also repaired the columns retained from the old Palm House. Together they also recondi-

tioned the east ends of the Cactus and Succulent Houses isolated now through removal of the Economic and Fern Houses. Grounds crewmen managed to win the race with time by successfully grading the ground in front of the Climatron, and producing a "fuzz" of new lawn by Dedication day.

The Grounds Operations also maintains the grounds of the National Council of Federated State Garden Clubs through a special cooperative agreement.

Building maintenance included redecoration in early spring of the "Friends of the Garden" and Main Gate offices. Sales facilities in the Main Gate office were greatly improved by the addition of cabinets and pegboard display panels. Main Gate facilities were further improved by the introduction of a See-Thru map designed and built by the Ground Department. This installation also includes a bulletin board of Garden attractions keyed to appropriate locations on the map. During the summer two of the growing houses of the Floral Display Department were reconditioned by replacing ridgecaps and renovating the ventilator sash. Late in the year major repairs and redecorating were begun in the Main Gate restrooms. The Ground Operations continued to work closely with the Historical Committee of the Garden in restorative work at the Shaw House, and the Mausoleum, by doing much preliminary work in preparation for the many special craftsmen called on for restorative repairs.

ENGINEERING OPERATIONS

KENNETH A. SMITH, Engineer

The background operations of the Garden providing heat, water, electrical services and the maintenance of equipment for all other branches has been performed under the direction of Kenneth Smith, Engineer, and James Hampton, his Assistant.

In addition to the regular operations, these men have assisted with the problems connected with the opening and operation of the new Climatron. These items include waterlines on both levels, installation of pump, piping and some concrete work for the waterfall; light shields for floodlights, and assembly, wiring and erection of the central light fixture. The framework for the artificial trees was welded by Hampton as a special project. Considerable time was required of these men to work with the various contractors, such as Minneapolis-Honeywell, in their installations of devices and special mechanical equipment for automatic controls in the Climatron.

The heating plant required a new refractory arch in No. 2 boiler. The boiler feed lines were replaced in the pump room.

Other operations about the Garden included new water lines in the Curiosity House; new furnace for the Main

Gate offices; spotlights for the Floral Display House and the Linnean House; additional wiring for the Shaw Home; and experimental equipment for use of research workers in the Experimental Greenhouse.

ARBORETUM

FRANK L. STEINBERG, SUPERINTENDENT

THE Arboretum continues to be managed with a skeleton crew, yet the roads have been kept open, the grasslands managed and pruning and clearing continued. The area about the Pinetum Lake is open to cars daily, The longer drive past the dogwoods, redbuds and many drifts of naturalized daffodils to the trailhouse and wildflower trails was kept open for six weeks in April and early May.

Mowing required 727 tractor and man hours. The Pinetum was mowed in the late Spring and again in the Fall. All planted groups in the Pinetum were cleared of brush and sprouts, and dead trees were removed. All the groups are clean and this should help the daffodil display in the Spring. Mowing 120 acres on the farm required 108 tractor and man hours.

Guard rails on all the bridges were cleaned and painted. Minor repairs were made to the roof and gutters of the old brick residence. Brenner's residence also required minor repairs. The Gate House was repainted.

INFORMATION CENTER

THE Main Gate offices were repainted, new shelves, peg boards and a new heating system installed to serve the Information Center and for offices of the "Friends of the Garden" organization. The sales of books, pamphlets, correspondence and general public information are served by Mabel Shepherd during the weekdays, and by Trifon von Schrenk and Jess Mayhan on weekends and during evening hours. George Pring answered numerous requests for information, appeared on radio and television programs and gave a number of lectures. He represented the Garden at the Third Orchid Conference in London, England. He visited the Oxford and Cambridge Botanic Gardens and spent a week of study in the herbaria of Kew Gardens and British Museum on research in the *Nymphaeaceae* to find new species that might be useful in future breeding work at the Garden. He spent three days at Floriade (Floricultural Exhibition) in Rotterdam, Holland. He visited the Gubler Greenhouses in Zurich, Switzerland, which specializes in orchids and foliage plants.

The new and improved Information Center with its enlarged and improved selection of books, pamphlets on plants, and souvenir items is attracting a larger number of visitors.

MISSOURI BOTANICAL GARDEN PROGRAMS

SPECIAL SHOWS AND DISPLAYS

Bulb Show, March 5 through 19
Easter Display, March 26 through April 2

FREE NATURE PROGRAMS FOR CHILDREN, aged seven and over, are held every Saturday morning from 10:00 to 11:30 A. M., Museum Building.

March 4 Three Cheers for the Green Thumb
(you may take your plants home)
March 11 The Secret Life of a Plant
March 18 The Story of the Pincushion Forests
March 25 Make Your Own Dwarf Garden
(bring your own container)

COURSES FOR ADULTS. Beginning in March

104 How to Propagate from Seed. (Two Sections). 5 Sessions, Fee $12.00.
Tuesdays, March 14 and 21, April 4, 11 and 18, 1:00 to 2:30 P. M.
Thursdays, March 16 and 23, April 6, 13 and 20, 8:00 to 9:30 P. M.

Fundamental facts and procedures for producing annuals, biennials and some perennials from seed for use in your garden. The Garden supplies seed, germinating media and soil for four metal flats of seedlings which you may take home. Persons wishing to supply their own seed must bring it to the first session. Instructor Clarence Barbre.

206 Economic Botany. 5 sessions, Fee $10.00
Wednesdays, March 15 and 22, April 5, 12 and 19, 8:00 to 9:30 P. M.

General instruction in useful plants and their relation to man are studied, using the Garden's extensive collections of materials from archeological sites, primitive culture and modern breeding experiments. Instructor Hugh Cutler.

A SERIES OF LECTURES ON RESEARCH AT THE GARDEN.

GIVEN THE FIRST MONDAY OF EACH MONTH

"The Evolution of Some New World Plants"
Dr. Hugh Cutler, March 6, 8:00 P. M., Museum Building.

"Orchid Hunting in South America."
Dr. C. H. Dodson, April 13, 8:00 P. M., Museum Building.

Dr. Dodson, Taxonomist and Research Associate in the Herbarium, assisting in the preparation of the Garden's "Flora of Panama."

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CLARENCE BARBRE, Instructor

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SOME FACTS ABOUT SHAW'S GARDEN

The Missouri Botanical (Shaw's) Garden was established in 1859 by Henry Shaw, a St. Louis businessman, to be controlled by a Board of Trustees for the public benefit. The Garden is a non-profit institution which receives no support from the city or state, depending on the income from the Shaw estate supplemented by contributions from the public.

The old stone walls and cast-iron fences, the Linnean House, the Museum Building, the part of the Administration Building which was Shaw's Town House, relocated in the Garden in 1890, and the Tower Grove House, his country home, all date from Mr. Shaw's time. The Main Gate, display and growing greenhouses and most other facilities date from the period immediately following the turn of the century. The Climatron, opened in 1960, is the first of several new buildings planned for the Garden's redevelopment. It is the world's first geodesic dome, fully climate-controlled greenhouse and contains the Garden's tropical collections.

The Garden—70 acres—is open every day of the year (except Christmas and New Year) from 9 A. M. until sundown, the greenhouses 9 A. M. to 5 P. M., the Climatron Monday through Thursday 9 A. M. to 5 P. M., Friday through Sunday 9 A. M. to 9 P. M. Tower Grove House is open daily from 1 P. M. to 4 P. M. (December to March on weekends only). The Display House presents four seasonal displays: November, Chrysanthemums; December, Poinsettias; February, Orchids; Spring, Lilies and other flowers. During the year are other shows, competitions and festivals sponsored by various Garden Clubs and Flower Societies.

Courses in Botany and Horticulture for adults are conducted by the Garden staff. Children's nature studies are provided each Saturday of the year and a special nature program is held during the summer. Information on these activities is published in the BULLETIN or may be had by mail or phone. The Garden maintains a research program through the Henry Shaw School of Botany, Washington University.

In 1926 an Arboretum — 1600 acres — was established at Gray Summit, Missouri. Foot trails and roads pass through the Arboretum and are open to visitors in April and May.

The Garden Administration Building is located at 2315 Tower Grove Ave., and the Garden main entrance is at Tower Grove and Flora Place. The entrance at Tower Grove and Cleveland Avenue is also open to the public. The Garden is served by both the Sarah (No. 42) and the Park-Southampton (No. 80) city bus lines.

Persons interested in helping to support the Garden and taking part in Garden activities are urged to do so through the "Friends of the Garden". Information may be obtained from the Main Gate or by mail or phone.